

## **Briefing Statement**

Bureau: National Park Service  
Issue: Air Quality at Great Smoky Mountains National Park  
Date: April 05, 2005

**Background:** Monitoring and research conducted over the past 25 years in Great Smoky Mountains National Park (GRSM) has shown that air pollution is significantly affecting park resources (streams, soils, vegetation and visibility), visitor enjoyment and public health. The burning of fossil fuels (e.g. coal, oil, and gasoline) produces emissions of sulfur dioxide (SO<sub>2</sub>) and nitrogen oxides (NO<sub>x</sub>) that convert into harmful secondary pollutants (e.g. sulfates, nitrates, fine particles, and ozone). Winds coming into the southern Appalachian Mountains carry pollutants from as far away as the Tennessee, Ohio, and Mississippi River valleys, the industrial cities of the Southeast and Midwest, the Gulf States and the Northeast.

## **Current Status:**

Great Smoky Mountains National Park experiences some of the highest air pollution of any national park. Although air quality in most urban areas throughout the country had been improving over the past two decades, air quality at Great Smoky Mountains had been showing signs of further deterioration. The most recent air quality information (1994-2003), however, shows that air quality at the park is improving (visibility and fine particles) or remains stable (ozone concentrations and acid deposition).

- Ozone concentrations have exceeded standards designed to protect public health, and vegetation throughout the park has foliar injury caused by ozone (e.g., 90 plant species exhibit ozone-like foliar injury). Ozone levels had been increasing at GRSM between 1990-99, but the trend has been stable over the past decade with a marked decrease during the summer of 2004 (likely due to significant reductions in nitrogen oxide emissions in the eastern U.S. as well as weather conditions).
- Annual average visibility is 25 miles, much less than the estimate of natural visibility conditions (113 miles). Sulfates are the primary cause of visibility impairment. Visibility has improved over the past decade (about a 2 deciview (20 percent) improvement on the worst visibility days), in response to more favorable weather conditions and pollution reductions required by the acid rain program.
- Chronic and episodic acidification are adversely affecting high elevation sensitive streams and soils. The acidity of annual precipitation measured at the park is 5-10 times more acidic than natural rainfall. Wet nitrate deposition had been increasing (1981-2003) and wet sulfate deposition had been decreasing at the park (1981-2003), but the trend in nitrate and sulfate concentrations in precipitation has been stable over the past decade (1994-2003).

## **Future Prognosis:**

Air quality is expected to continue to improve at Great Smoky Mountains National Park because of new air quality regulations and other actions:

- New programs took effect in the summer of 2004 that reduced NO<sub>x</sub> emissions in most eastern states by 30 percent. In 2004, the Tennessee Valley Authority

- installed NOx emission controls (selective catalytic reduction) on 2 of the closest power plants to the Park, which reduced NOx emissions from those plants by 71 percent during the ozone season compared to 2003 levels. This should lead to less ozone pollution in the park and reduced nitrogen deposition.
- EPA issued a Nonroad Diesel Rule that will cut emission levels from construction, agricultural and industrial diesel-powered equipment by more than 90 percent between 2008 and 2015. The new rule will also remove 99 percent of the sulfur in diesel fuel by 2010.
  - The Clean Air Interstate Rule recently published by EPA will cut electric utility emissions of sulfur dioxide, nitrogen oxide, and mercury by an additional 73, 61, and 70 percent, respectively, over the next 10 years. Pollution would be “capped” at the reduced levels, thereby generally providing long-term protection against future air quality deterioration caused by utilities. Similar reductions would be achieved through the Clear Skies legislation pending in Congress.
  - The Tennessee Valley Authority announced in Fall 2001, that they will be installing SO2 controls (scrubbers) on 2 of the closest power plants to the Park, which will reduce SO2 emissions from those plants by over 95 percent.
  - The NPS is collaborating with States and regional planning organizations to develop visibility protection plans for Great Smoky Mountains and other Class I areas by the end of 2007. These plans will ensure that reasonable progress is made toward improving visibility, with the goal of achieving natural conditions by 2064.

**For more information:**

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